The state of online impulse buying research: A literature analysis

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Abstract

Online impulse buying has drawn increasing scholarly attention across disciplines. However, little effort has been made to evaluate the status of research and consolidate the findings in the literature. To address this research gap, we conducted a systematic review of studies of online impulse buying, and used the Stimulus-Organism-Response framework to identify and classify the factors that affect online impulse buying. We then built a conceptual framework to explain the interrelationships between the three key elements of online impulse buying. Finally, we discussed the future research directions and implications to research.

Keywords: Online impulse buying; Literature analysis; Electronic commerce; Stimulus-Organism-Response framework

1. Introduction

Impulse buying, described as unplanned, compelling, and hedonically complex purchasing behavior [46], has been widely studied in academia and business for decades. In the marketing literature, considerable effort has been devoted to identifying the factors (e.g., consumer characteristics, store characteristics, situational stimuli, and product characteristics) that influence impulse buying [49]. With advances in information technology and the tremendous growth of e-commerce, online impulse buying has become epidemic. It is estimated that about 40% of all online consumer expenditure is attributable to online impulse buying [30]. Researchers have argued that the online shopping environment is now more conducive to impulse buying behavior than its offline counterpart [14], as the online shopping environment frees consumers from the constraints (e.g., inconvenient store locations, limited operating hours, and social pressure from staff and other consumers) that they might experience during physical shopping activities.

Online impulse buying is defined as a sudden and immediate online purchase with no pre-shopping intentions [37]. Our preliminary review of studies of online impulse buying showed that the scope of research on this behavior is broad. However, although systematic reviews of offline impulse buying research are common [e.g., 24, 33, 49], little effort has been devoted to consolidating the existing knowledge in the context of online impulse buying. Given the importance of this research area to business and society [29], a systematic review of previous studies of online impulse buying was needed to synthesize research findings, identify research gaps and opportunities, and offer future research directions. Therefore, this study had three major objectives: (1) identifying research patterns that emerge from existing studies of online impulse buying; (2) consolidating factors associated with online impulse buying; and (3) building a conceptual framework that describes the interrelationships between the key elements of online impulse buying to provide a foundation for future research.

This paper proceeds as follows. In the next section, we introduce the concept of impulse buying and provide an overview of the current state of research. We then describe the procedures used in the literature search and identification. We provide a preliminary analysis of the 34 identified studies and explain the current state of research on online impulse buying. We use the Stimulus-Organism-Response (S-O-R) framework to classify the factors associated with online impulse buying. Then, we develop a conceptual framework explaining the interrelationships between the key elements of online impulse buying. Finally, we offer recommendations for future research and conclude the paper with a discussion of its theoretical implications.

2. Online impulse buying

Early research defined impulse buying as any unplanned purchase that was the result of a comparison of alternative purchase intentions with actual outcomes; these studies focused on the comparison of the actual shopping outcome with the intended shopping goal [27]. Some researchers, emphasizing the effect of environmental cues, suggested that impulse buying is the result of exposure to in-store stimuli [3]. More recent studies have conceptualized impulse buying as a process-outcome mechanism within the domain of an individual-psychological approach that occurs when a consumer experiences a sudden, often persistent urge to buy something immediately. Such an impulse is hedonically complex and may stimulate emotional conflict [40]. Four types of impulse purchases have been identified in the literature: pure impulse buying, reminder impulse buying, suggestion impulse buying, and planned impulse buying [46]. Pure impulse buying occurs when consumers make a novelty or escape purchase that breaks a normal buying pattern; reminder impulse buying occurs when consumers see an item and are alerted that the stock of the product is low or recall an advertisement and a previous decision to buy; suggestion impulse buying occurs when consumers first meet an item and realize a need for it; and planned impulse buying occurs when consumers have a particular shopping list, but also the expectation and intention to make other purchases based on promotions and discounts.

With the proliferation of e-commerce activities, online impulse buying is now prevalent among consumers. Shopping online frees consumers from the constraints that they might experience in physical stores, which in turn increases the likelihood of impulse buying. In addition to testing the extent to which the dynamics of offline retailing are applicable to the online environment, research on online impulse buying has tended to emphasize the effects of website features embedded in shopping websites. Although these two lines of research have enriched our scientific understanding of online impulse buying, the divergence between the theoretical conceptualization and the operationalization of the concept has resulted in a fragmentation of the online impulse buying literature. The findings are often inconclusive and knowledge is hard to consolidate. Therefore, it was necessary to summarize

existing findings and identify patterns and to develop meaningful conclusions based on existing studies.

3. Literature search and identification

This study consolidated the extant knowledge of online impulse buying. We used a two-stage approach [52] to search and identify articles that examine online impulse buying. The two-stage review methodology offered a rigorous approach to guide the search process and thus reduce data collection bias [50]. Figure 1 presents the literature search and identification procedures.

[Insert Figure 1 here]

In the first stage, we identified articles addressing online impulse buying. We used academic and peer-reviewed journals as our data source, as their findings are considered to be validated and are more likely to influence the academic and business fields [38]. We used two methods to identify relevant papers. First, we conducted a systematic search in the online databases. Given the plurality of the meaning embedded in the term "impulse," we adopted a broad range of terms to represent "impulse buying," and used these keywords as the selection criteria for the topic. Second, we conducted a manual search in ten management information systems journals and three marketing journals to ensure that no major articles on online impulse buying were neglected (see Figure 1). We found 41 relevant articles published in the 2002 to 2014 period. In the second stage, we applied inclusion and exclusion criteria to the initial set of articles to ensure that the articles were relevant and merited further analysis. Specifically, we only included studies that had online impulse buying as their core focus, and we excluded those with no empirical results. Two researchers independently reviewed and eliminated articles. From this, we identified 33 online impulse buying articles. Following the guidelines of Webster and Watson [52], we further conducted a forward search of the identified articles and were able to identify one additional relevant study. Together, we identified 34 relevant online impulse buying articles.

4. Preliminary review

To conduct the literature analysis, we applied a serious of guided questions to prior studies [e.g., 2, 19]. These questions allow researchers to synthesize prior research findings. They were as follows:

1. What were the research trend and focus?
2. What were the major theories or theoretical foundations?
3. What was the research methodology?
4. What were the research context and sample?
5. What were the factors affecting online impulse buying?

Each of these questions are addressed in the subsequent sections. Detailed analyses of the 34 identified studies are presented in Appendix A.

4.1. Overview of research trends and focus

Research on online impulse buying began in the last decade. The number of studies of online impulse buying grew steadily in the earlier years and increased exponentially with the emergence of e-commerce activities. More than two-thirds of the studies (n=25) were published in the 2009-2014 period. In this review, we found three predominant disciplines: management information systems (59%), marketing (21%), and management (9%) (see Figure 2).

[Insert Figure 2 here]

There are two main streams of research in the online impulse buying literature. The first stream of research focuses on the effect of website cues on online impulse buying. For instance, Koufaris [28] used the technology acceptance model (TAM) to investigate the effect of a value-added search mechanism on impulse buying. Adelaar et al. [1] explored the effects of media formats (i.e., text, still image, and music video) on consumers' impulse buying intentions. Parboteeah et al. [35] tested the influence of website characteristics (i.e., task-relevant cues and mood-relevant cues) on consumers' internal reactions and the urge to buy impulsively. The second stream of research examines how offline impulse buying factors explain impulse buying behavior in the online context. For instance, Chih et al. [8] tested the role of hedonic consumption needs in triggering consumers' urge to buy impulsively. Dawson and Kim [10] explored the effects of different marketing promotion tactics on online impulse buying.

We further classified the identified studies by the four types of impulse purchases (i.e., pure impulse buying, suggestion impulse buying, reminder impulse buying, and planned impulse buying [46]). We found that most studies adopted the conceptualization proposed by Beatty and Ferrell [5] and focused on pure online impulse buying behavior [7, 13, 17, 20, 22, 25, 28, 30, 35, 36, 43, 44, 51, 53, 60]. One stream of research measured pure online impulse buying using survey questionnaires [7, 25, 30, 35, 36, 44, 51, 53, 60]. The authors used statements such as "I had a desire to buy items that did not pertain to my specific shopping goal" to operationalize pure online impulse buying behavior. An alternative stream of research captured pure online impulse buying in experimental settings [13, 17, 20, 22, 28, 43]. The authors of these studies considered any products that were bought beyond the subjects' initial shopping list as instances of pure online impulse buying.

4.2. Overview of theoretical foundation

Table 1 presents a summary of the theories and frameworks adopted in existing online impulse buying studies. The S-O-R framework has remained the most popular theoretical approach to online impulse buying behavior in the last decade [e.g., 15, 25, 30, 35]. Some researchers have explained impulse buying behavior with other theoretical perspectives, such as flow theory [e.g., 21, 28, 55], the reflective-impulsive mechanism [e.g., 44], and cognition-emotion theory [e.g., 51]. These diverse

perspectives have provided a more in-depth explanation of the underlying mechanisms connecting stimulus, organism, and response.

[Insert Table 1 here]

4.3. Overview of research methodology

As shown in Figure 3, experiments and surveys were the two most popular research methods for examining online impulse buying. These two methods were used to understand the different types of stimuli that trigger consumers' impulse buying responses. Researchers used experimental studies to examine the effect of websites features on online impulse buying. For example, Adelaar et al. [1] studied the display formats (i.e., text, still images, and video) of a virtual store and explored their effects on consumers' emotions and buying impulses. Such experimental settings allowed researchers to draw conclusions about the effect of a particular website feature on online impulse buying. Alternately, investigations of consumers' perceptions, attitudes, and intentions toward online impulse buying relied heavily on survey data [e.g., 30, 51]. For instance, Verhagen and van Dolen [51] distributed an online questionnaire to consumers who had just finished their shopping in an online fashion store. They found that functional convenience (i.e., merchandise attractiveness) and representational delights (i.e., enjoyment and website communication style) were salient factors in impulse buying responses. The use of surveys allowed researchers to explore the influence of the unobservable constructs (such as personality) on online impulse buying.

[Insert Figure 3 here]

4.4. Overview of research context and sample

The majority of the identified studies were conducted in the United States [e.g., 7], followed by Asia [e.g., 8], with relatively few in Europe [e.g., 6]. Most of these studies used university student samples to validate the research model. Prior studies suggested that the use of student samples was appropriate because young people are the dominant group of online consumers [e.g., 35]. Both experience goods (such as music CD) and search goods (such as stationery) were tested in these studies [e.g., 1, 4, 16, 35]. There is now ample empirical evidence that online impulse buying occurs regardless of product type; once the study respondents were exposed to internal and external stimuli, they were inclined to buy impulsively.

5. A classification framework of online impulse buying factors

As mentioned in the previous section, the Stimulus-Organism-Response (S-O-R) framework was the most commonly used theoretical foundation in online impulse buying studies, possibly because this framework has traditionally provided the foundation for consumer behavior studies. Furthermore,

most research of online impulse buying has emphasized the role of environmental cues in online impulse buying behavior. Regardless of their adopted theoretical frameworks, existing studies of online impulse buying have consistently examined the relationships between environmental cues, consumers' cognitive and affective reactions, and the resulting behavior, and have largely drawn on the environmental psychology paradigm, which can be reconciled with the S-O-R framework. Therefore, we adopted the S-O-R framework to guide the classification of variables in online impulse buying studies. Figure 4 depicts our classification framework.

[Insert Figure 4 here]

The S-O-R framework is an extension of the classical Stimulus-Response (S-R) approach. There are three major elements of the S-O-R framework:

- stimulus (S), which is a trigger that arouses consumers,
- organism (O), which is an internal evaluation of consumers, and
- response (R), which is an outcome of consumers' reaction(s) toward the online impulse buying stimuli and their internal evaluations.

We reviewed the 34 identified studies and extracted all of the variables related to the three key elements (stimulus, organism, and response) of the S-O-R framework. In classifying the factors related to online impulse buying, two authors independently coded the factors. For example, Liu et al. [30] conceptualized visual appeal and website ease-of-use as the website attributes that induce consumers' internal reactions. These two constructs were then consolidated under the website stimuli (survey) section in our classification framework. When there was a disagreement between the two authors, or where there was no clear conceptualization in the identified study, the third author facilitated discussions to reach a coding consensus. The judgment of the two authors was consistent, as shown by a minimum Cohen's kappa of 0.8 across categories.

5.1. Online impulse buying stimulus

A stimulus is a trigger that arouses consumers. There are two types of stimuli: external and internal. In this literature analysis, the external stimuli were website stimuli, marketing stimuli, and situational stimuli and the internal stimuli were consumer characteristics.

Website stimuli are cues embedded in a shopping website that are visible and audible to consumers [14]. As shown in Table 2, we identified two main streams of research on the role of website stimuli: (1) studies of the effects of particular website features/presentations on online impulse buying that used experimental manipulations, and (2) studies of the perceptions of, or beliefs about, website stimuli that used survey data. The first set of studies used experiments to investigate the role of website characteristics in online impulse buying [e.g., 53]. These studies focused on the effects of visual elements such as media format, colors, and graphics on online impulse buying responses [1, 35,

53]. The second set of studies used surveys to examine how the perceptions of websites influence online impulse buying [e.g., 30]. In these studies, website stimuli were operationalized as perceptual measures (e.g., perceived website quality) and the respondents were instructed to recall and indicate their perceptions of or beliefs about an online shopping website, their internal reactions, and their online impulse buying behavior.

[Insert Table 2 here]

Marketing stimuli are the marketing cues that marketers use to entice consumers to make a purchase [57]. As shown in Table 3, researchers have tested the effects of different marketing tactics and promotional campaigns, such as limiting the offer period [60] and providing discounts [56], on consumers' impulse buying. When examining marketing stimuli, researchers used both qualitative and quantitative approaches. For instance, Dawson and Kim [9] conducted interviews with consumers and solicited their feedback about the types of marketing activities that triggered their online impulse buying tendencies. Zheng et al. [60] manipulated types of marketing promotions in a controlled laboratory setting.

[Insert Table 3 here]

Situational stimuli are the social or environmental factors associated with a particular consumption occasion that affect consumers' buying responses [11]. Situational factors may increase or decrease consumers' propensity to buying impulsively. Although situational stimuli have been widely studied in the offline impulse buying context, few studies have explored situational stimuli in the online impulse buying context (See Table 4): product availability was the only factor related to situational stimuli found in the identified articles.

[Insert Table 4 here]

Impulsive consumer characteristics are inherent factors of consumers that are related to their propensity to act impulsively [23, 49]. Previous studies reported that certain consumer characteristics are more responsive to impulse buying, such as age [37], culture [54], and personality traits [40]. As shown in Table 5, the tendency toward impulse buying or impulsiveness has received the most attention in prior studies.

[Insert Table 5 here]

5.2. Online impulse buying organism

In our framework, organism refers to consumers' internal evaluations. There are two types of organisms: cognitive and affective.

Cognitive reactions are the mental processes that occur when consumers interact with stimuli; they take place when consumers become aware of potential constraints during the online impulse buying process [35]. Positive cognitive reactions stimulate, and negative cognitive reactions deter, consumers' buying responses [18]. Table 6 presents the known factors related to cognitive reactions in online impulse buying.

[Insert Table 6 here]

Affective reactions are the emotional responses that arise when consumers interact with an environment [47]. Consumers indulge in online impulse buying responses when they experience positive affective reactions, such as pleasure and arousal [1, 44]. It has been suggested that pleasure motivates impulse buying, and arousal mobilizes the process [42]. As shown in Table 7, enjoyment, impulsiveness, pleasure, and arousal were the most commonly examined affective reactions associated with online impulse buying responses [e.g., 1, 15, 55].

[Insert Table 7 here]

5.3. Online impulse buying response

A response is a consumer's reaction to online impulse buying stimuli and organisms [31]. As shown in Table 8, the urge to buy impulsively and online impulse buying were the two commonly cited response variables. Measuring actual impulse buying behavior has been reported as challenging and sometimes problematic [35] because respondents tended to behave in a socially desirable manner when they were being observed in an experiment or when completing a self-reported survey [41]. Therefore, the urge to buy impulsively was commonly used in studies as a surrogate for estimating the actual online impulse buying [e.g., 30, 53].

[Insert Table 8 here]

6. A conceptual framework of online impulse buying research

To synthesize the findings from the identified articles, we proposed a conceptual framework to provide a more comprehensive picture of the extant knowledge. The S-O-R framework was used because it is the dominant theory in the literature. Some studies have further enriched this framework by explaining the relationships between the three key elements of the S-O-R framework using other theoretical perspectives. Building on the S-O-R framework, this section presents and discusses the interrelationships between online impulse buying factors, and their related theoretical foundation. Figure 5 depicts the conceptual framework.

[Insert Figure 5 here]

6.1. Effect of online impulse buying stimulus

The literature analysis showed that the online impulse buying stimuli have both direct and indirect effects on the online impulse buying response. Some studies suggested that impulse buying responses are often the immediate results of exposure to various stimuli (i.e., a direct relationship) and thus online impulse buying is a rapid and impulsive process [35] (see Table 9). Other studies have conceptualized online impulse buying as the product of consumers' reactions to external stimuli and internal reactions (i.e., an indirect relationship) (see Table 10).

6.1.1. Direct effect of online impulse buying stimulus. Table 9 presents the direct relationships between an online impulse buying stimulus and response and the underlying theoretical foundation. Some researchers have applied an environmental psychology approach and suggested that online impulse buying is a result of an interaction between the individual and the website environment. For instance, Wells et al. [53] applied latent trait theory and found that impulse buying was triggered by two types of precursors: (1) the state of mind created by the environment (website quality), and (2) a specific personality trait inherent in consumers (impulsiveness). Another group of researchers used rational-based theoretical models to explain the direct effect of the online impulse buying stimulus. For example, Zheng et al. [60] drew on reactance theory and found that a marketing stimulus (quantity scarcity) aroused consumers' desire to buy a product impulsively.

Although most studies have found a positive relationship between the stimulus and online impulse buying response, there are some exceptions. For example, ease of use has been reported to be negatively associated with the online buying impulse [6]: when consumers completed their task easily, they left the website sooner and thus were less tempted to buy impulsively. The variety of selection [36], and the quality and quantity of information [6] have also been found to deter online impulse buying: when consumers were exposed to too many choices, they tended to engage in deeper evaluations. Thus, a wide range of choice and a vast amount of information induce rational informational processing. The literature analysis also showed that the relationships between some stimuli (e.g., informational social influence [16] and security and privacy [6]) and online impulse buying were insignificant.

[Insert Table 9 here]

6.1.2. The indirect effect of online impulse buying stimulus. Table 10 summarizes the empirical relationships of the indirect effects of the online impulse buying stimulus on response. As mentioned in Section 5.2, organism reactions may be affective or cognitive. Previous studies have found that the two reactions mediate the relationships between online impulse buying stimulus and responses. Most studies have used the S-O-R framework to justify this relationship. For instance, Moez [32] found that the quality of e-service produced pleasure in a virtual platform, which in turn led to online impulse

buying. Gwee and Chang [17] adopted heuristics information processing to explain online impulse buying. Specifically, they found that scarcity and popularity claims fostered heuristics information processing and stimulated consumers' desire for a product, which eventually led to impulse buying behavior.

[Insert Table 10 here]

6.2. Interplay between cognitive and affective reactions

Previous research found that when consumers interacted with a shopping website, they processed the information received and developed affective appraisals of the website [35]. Table 11 summarizes the relationship between cognitive and affective reactions. Overall, previous research has shown that a positive cognitive reaction is strongly associated with a positive affective reaction. For example, Chih et al. [8] reported that consumer judgments of the appropriateness of impulse buying behavior (normative evaluation) induced positive affect on an online impulse buying occasion. Verhagen and van Dolen [51] applied cognitive emotion theory and pointed out that beliefs precede emotions, and thus perceptions of merchandise attractiveness and website communication style are important factors that generate positive affect and suppress negative affect (see Table 11).

[Insert Table 11 here]

6.3. Chain effect of online impulse buying response

Previous studies have described a two-stage response resulting from exposure to an online impulse buying stimulus and organism [25, 44, 51]. First, when consumers encounter a stimulus on a shopping website (directly, or indirectly through the effect of internal evaluations), they experience the urge to buy impulsively. Second, they actualize the urge by using the shopping cart (i.e., making a payment). When consumers experience more buying urges, they are more likely to make an impulse purchase. The relationship between the urge to buy impulsively and impulse buying has been described as a chain effect at the response stage in studies of both offline and online impulse buying [e.g., 5, 44, 51]. For example, Verhagen and van Dolen [51] and Shen and Khalifa [44] found a positive and significant relationship between the urge to buy impulsively and online impulse buying behavior.

[Insert Table 12 here]

6.4. Moderating role of impulsive consumer characteristic

Previous studies have shown that consumers with higher impulsiveness are more responsive to online impulse buying stimuli, and are more likely to respond to the online impulse buying organism, highlighting the moderating role of the impulsive consumer characteristic. According to latent

state-trait theory, impulsiveness strengthens the relationship between website quality and the urge to buy impulsively [53]. Value perception has been reported to moderate the relationship between the buying impulse and impulse enactment under the reflective-impulsive model [25, 44] (see Table 13).

[Insert Table 13 here]

7. Discussion

In the past decade, online impulse buying has attracted increasing scholarly attention across disciplines. However, little has been done to summarize the findings. In this paper, we synthesized the research on online impulse buying, consolidated online impulse buying factors into a classification framework, and summarized the empirically validated relationships within a conceptual framework of online impulse buying. In the following sections, we offer our recommendations for future research addressing the research gaps identified in the literature. Finally, we discuss the contributions and limitations of this study.

7.1. Recommendation for future research

7.1.1. Developing a typology of website stimuli. The literature analysis showed that different types of stimuli have not received equal attention from researchers. Studies of website stimuli and consumer characteristics dominate the literature. Furthermore, most studies conceptualized and operationalized website stimuli in terms of general beliefs about websites usage (e.g., perceived ease of use). In other words, the particular and context-specific website stimuli that trigger consumers' online impulse buying behavior remain relatively under-explored. Thus, it would be meaningful to develop a typology of website stimuli and explore their relationships with online impulse buying in a systematic way. For instance, Parboteeah et al. [35] attempted to classify website stimuli into high- and low-task-relevant cues and explored the effect of these cues on consumers' internal reactions.

7.1.2. Reconsidering the role *of cognitive reaction.* The classic literature on impulse buying suggests that impulse buying is a rapid process, in which thoughtful and deliberate consideration of information and alternative choices is precluded [40]. When consumers encounter a stimulus, their internal evaluation is often dominated by high-arousal emotions [11]. Cognitive processing takes place between the buying impulse and enactment when consumers realize there are potential constraints (such as availability of money) [41]. In this literature analysis, we found two different conceptualizations of online impulse buying. Some studies viewed online impulse buying as a hedonic and unreflective process, which lacks serious cognitive reactions [e.g., 1], whereas others included the effects of cognitive reactions, highlighting the role of cognitive effort in mediating the relationship between stimulus and response [e.g., 30]. As the purpose of our study was to synthesize the findings of published studies on online impulse buying, we presented both types of empirically validated relationships in the conceptual framework. Indeed, the four types of impulse buying

behavior identified by Stern [46] reflect various degrees of cognitive processes involved in a buying process. For example, in buying processes classified as pure online impulse buying behavior, consumers are usually making a novel and spontaneous online purchase that breaks their normal buying pattern. In this case, little cognitive reaction is involved. Alternatively, if consumers make an online impulse purchase due to the recognition of needs prompted by a suggestion list, cognitive reactions may be relevant, as they are involved in evaluating the usefulness of the suggested item. Thus, we expect that Stern's [46] classification of impulse buying remains important and, to justify the inclusion and exclusion of cognitive reaction in the research model, future studies should clarify which type of impulse buying they are measuring. With the advance of website analytic tools, researchers can now easily measure and identify a consumer's online shopping journey and their online footprints. They can also make use of these tools in their experimental design to capture the four different types of impulse buying behavior.

7.1.3. Using the neurophysiological approach to capture online impulse buying. Although experimental and survey designs are prevalent in the online impulse buying literature, researchers have recognized methodological deficits in the capture of actual online impulse buying behavior. For instance, responses captured from experimental settings in a controlled laboratory setting tended to suffer from demand artifacts (i.e., the experimental designs may cause the subject to perceive, interpret, and act upon what he or she believes the experimenters are looking for) [35]. Responses collected from self-reported questionnaires are also exposed to the threat of social desirability bias [41]. Respondents may reply to the questionnaire in a socially desirable way and underreport the level or frequency of their online impulse buying. As such, experimental and survey research designs are arguably insufficient to fully capture online impulse buying behavior. Future research could consider using neurophysiological measures for method triangulation. A neurophysiological approach allows researchers to assess the degree of impulsivity using neurophysiological methods such as electrodermal activity (a measure of the conducting properties of the skin), pulse plethysmography (a measure of blood flow used to infer heart rate), and electromyography (an electrical measure of muscle activation)[39]. By combining these neurophysiological approaches with the experiment and survey, more rigorous and objective measurements of online impulse buying behavior can be obtained.

7.1.4. Using a more diverse sample in different contexts. In the literature analysis, we found that most studies used university student samples to validate the research model. As online shopping is becoming more popular across different age groups, it is worth examining online impulse buying behavior in a more diverse sample. This would greatly improve the generalizability of the research findings. Furthermore, researchers mostly used B2C online shopping websites (e.g., online fashion retail websites such as ASOS.com) as the research context to investigate online impulse buying

behavior. Yet, with the increasing popularity of group buying websites (such as Groupon.com), online impulse buying in the context of group buying websites deserves more attention. Specifically, the effects of group dynamics and the visual presentation of the deals and transaction records may impose significant social influences on consumers' impulse buying tendencies.

7.2. Contribution to research

This study advances our knowledge of online impulse buying. First, it uses a rigorous and comprehensive literature analysis to describe the research topic's focus, theoretical foundation, and research context. The literature analysis provides an overview of the current stage of research on online impulse buying. Second, this study consolidates factors associated with online impulse buying into a classification framework. More specifically, by extending the S-O-R framework, the online impulse buying factors were classified in terms of external stimulus (website stimulus, marketing stimulus, and situational stimulus), internal stimulus (impulsive consumer characteristic), organism (affective reaction and cognitive reaction), and online impulse buying response (felt urge to buy impulsively, online impulse buying behavior) (See Table 2-8). This classification framework provides researchers with a list of factors that have received notable scholarly attention, and a list of the factors that require more systematic investigation. Third, this study synthesizes the findings in the literature into a conceptual framework. In particular, the empirical findings are mapped onto the S-O-R framework, with their corresponding theoretical foundation highlighted in the subsequent tables (See Table 9-13). The conceptual framework thus reports the empirically validated relationships in the extant literature and demonstrates in a neat and systematic manner how online impulse buying factors are theoretically interrelated. Finally, this paper represents a necessary first step toward a thorough understanding of online impulse buying. It identifies important issues in the existing literature and proposes an agenda for future research. Further research can develop a typology of website stimuli in the context of online impulse buying, reconsider the role of cognitive reaction, use the neurophysiological approach to capture online impulse buying, and use more diverse samples in different contexts to test the proposed research model.

7.3. Limitations

Some limitations should be taken into account when applying the findings from this study. First, we are not shielded from the common limitations of a literature analysis. Our review was constrained to the pool of journals that satisfied our keywords and selection criteria. There is potentially additional knowledge in practitioner articles, books, and magazines from which researchers could gain insight. Future studies are recommended to explore articles and studies beyond academic journals to enrich the classification framework. Second, as this line of research is still emerging, the number of empirical studies remains insufficient for us to perform a quantitative meta-analysis and test the relative effects of the different types of impulse buying stimuli. Future studies are recommended to

replicate the studies in different contextual and cultural settings. It would then be possible to confirm the relationships and effects among these factors through a meta-analysis.

8. Conclusion

Through a rigorous search of the literature in key electronic databases and mainstream journals, we identified 34 studies of online impulse buying. Building on the S-O-R framework, we proposed a classification framework to summarize the factors related to online impulse buying and consolidated the empirically validated relationships within a conceptual framework. We highlighted the research gaps and proposed a research agenda for future investigation. We hope that this work adds knowledge to the research on online impulse buying.

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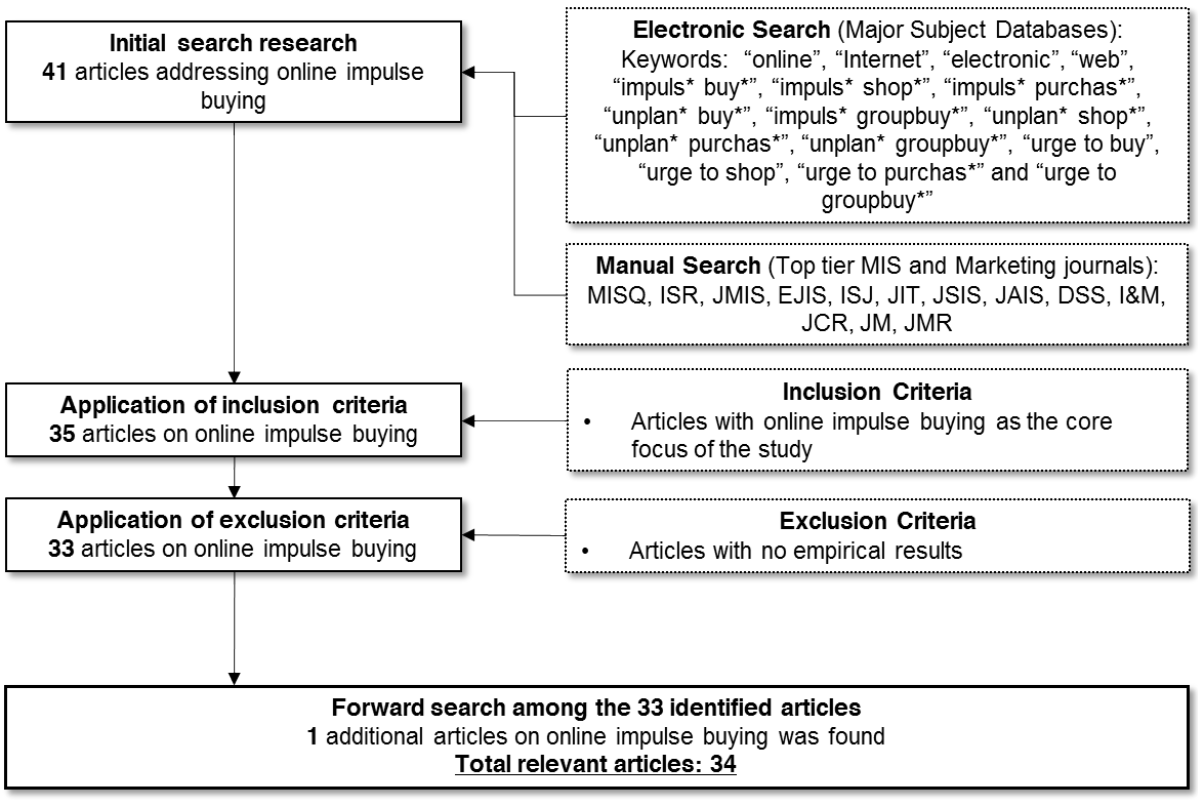

Figure 1. Literature search and identification procedures

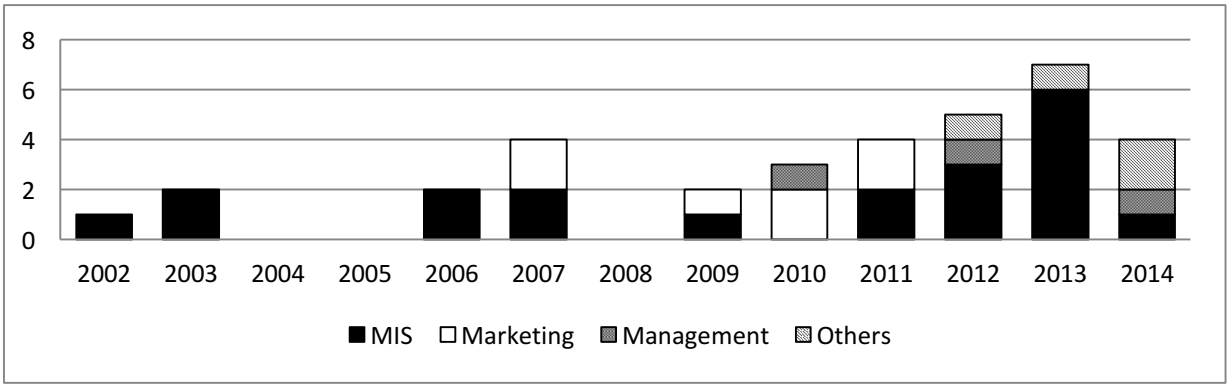

Figure 2. Research on online impulse buying across disciplines

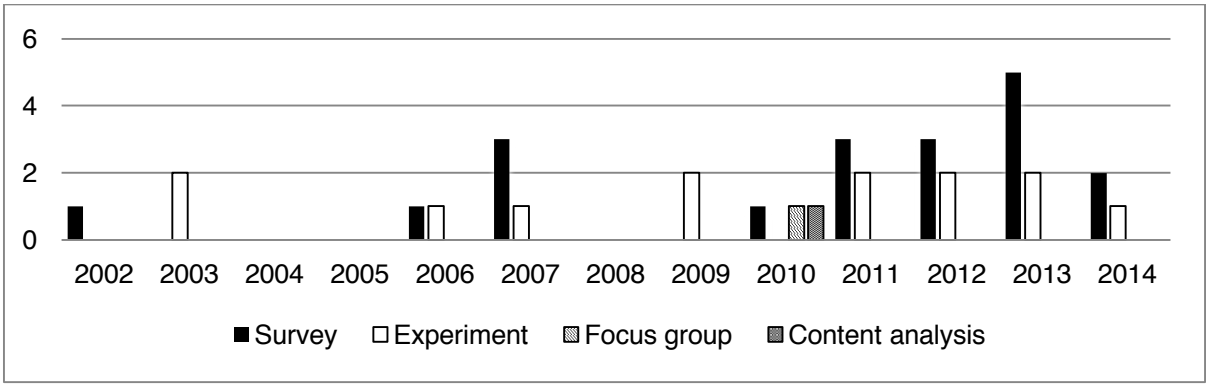

Figure 3. Research methodologies among the identified studies of online impulse buying

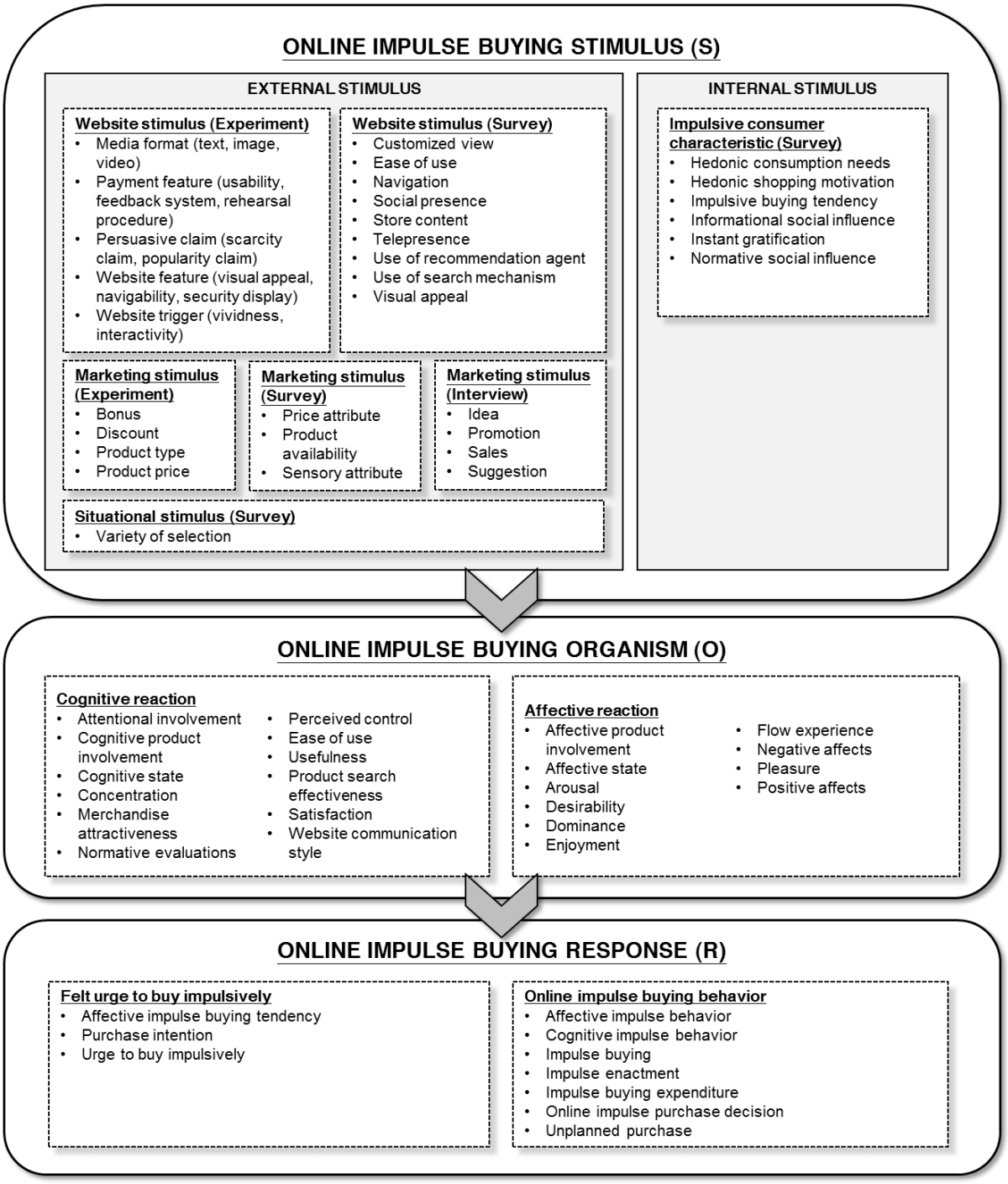

Figure 4. A classification framework of online impulse buying factor[1]

[1]All variables identified from the 34 identified studies were included in this classification framework. The classification of the variables was based on the conceptualization of the original paper.

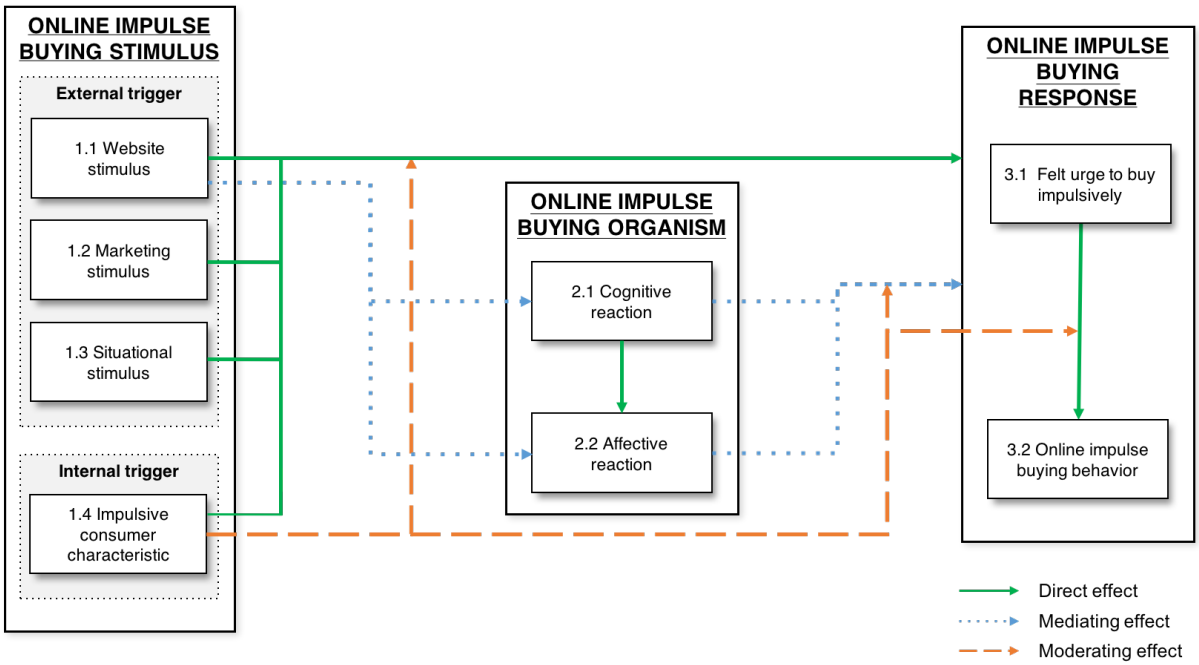

Figure 5. A conceptual framework of online impulse buying research[2]

[2] Only significant relationships were included in this framework

Table 1.
Summary of theoretical foundation

Theoretical foundation	Description	Study
Cognitive emotion theory	The theory suggests that emotions are resulted from the perception of evaluating a stimulus. Beliefs are assumed to be the precursors of emotions.	[51]
Distraction-conflict theory	The theory states that distractions and interruptions facilitate the performance of simple tasks but inhibit the performance of complex ones.	[7]
Elaboration likelihood model	The model posits that there are two paths to persuasion: the central path and the peripheral path. People react and behave differently while processing stimuli received from the environment.	[12]
Flow theory	The theory states that when individuals are in the stage of flow, they will deeply immerse themselves in an activity in such a way that nothing else seems to matter.	[21, 28, 55]
Heuristics information processing	The theory suggests that consumers are attracted to deals for increasingly scarce items because of fear; they worry the price will go up again when the stock is depleted.	[17]
Latent trait-state theory	The theory suggests that consumer behaviors are dependent on an individual's traits, the characteristics of the environment, and the interaction between these two variables.	[53]
Mowen's 3M model	The model assumes that narrower situation-specific behavioral tendencies are influenced by the effect of abstract, cross- situational traits.	[48]
Prospect theory	The theory posits that people assess income and expenses as gains and losses from a neutral reference point, instead of looking at overall wealth status.	[22]
Reactance theory	The theory proposes that individuals desire freedom of choice, and if such freedom is deprived by external constraints, people will engage in negative aversive responses.	[60]
Reflective-impulsive model	The model explains social behaviors with reflective and impulsive systems. The reflective system suggests that behavioral decisions are made based on knowledge about facts and values; while the impulsive system elicits behaviors through associative links and motivational orientations.	[25, 44]
S-O-R framework	The framework postulates that stimulating cues (stimuli) perceived from the environment trigger one's internal evaluation (organism), which subsequently leads to an approach-and-avoidance behavior (response).	[1, 15, 25, 30, 35, 44]
Technology Acceptance Model	The model explains how users come to accept and use a technology. Perceived usefulness and perceived ease of use are suggested to be the two factors that influence the decision.	[26, 28, 58, 59]
The consumption impulse formation enactment model	The model describes consumers' online impulse buying mechanism. The mechanism involves consumption impulses, constraining factors, and a volitional system that determines online impulse buying.	[9, 10]
Theory of resource allocation	The theory argues that mental resources are limited in one shopping occasion, and the depletion of the time resource by time pressure reduces cognitive resources for decision-making.	[60]

Table 2.

Summary of website stimulus

Research Design: Experiment		
Factor	Manipulation of feature	Study
Media format	Text, still images, or video	[1]
Payment feature	Usability, by way of changing the number of clicks needed to complete the transaction process	[13]
	Feedback system, by means of adding the reminder of the exact amount spent, as well as the running total of all purchases made after each individual purchase	[13]
	Rehearsal procedures, as a result of adding an additional step where the subjects were asked to type the amount they were spending to complete the purchase	[13]
Persuasive claim	Scarcity claim, through including a written statement or a visual icon that indicates a quantity or time restriction that has been imposed on a deal's availability	[17]
	Popularity claim, by including a written statement or a visual icon that indicates a high consumer demand for the product in terms of quantitative or qualitative cue	[17]
Website feature	Visual appeal, through changing colors of the background and graphics	[35, 53]
	Navigability, by changing different levels of the ease of navigation, or the use of the shopping cart	[35, 53]
	Security display, owing to the inclusion of policy statements and trust verification seals	[53]
Website trigger	Vividness, via adding multimedia displays	[25, 44]
	Interactivity, from movie choosing, database search customization, or title/posters moving around the screen	[25, 44]
Research Design: Survey		
Factor	Definition	Study
Customized view	The perceived ability of a website that can adapt products, services and environment to individual customers	[15, 32]
Ease of use	The perception about the extent to which the website can be browsed at ease	[30, 58]
Navigation	The organization and hierarchical layout of the content and pages in a website	[15, 32, 35]
Social presence	The feeling of being together	[25, 44]
Store content	The belief about the availability of the communicated material of a website	[15]
Telepresence	The perception about the sense of being located somewhere	[25, 44]
Use of recommendation agent	The belief about the use of recommendation agents to search for recommended products	[20]
Use of search mechanism	The belief about the information generated by the website	[28]
Visual appeal	The perceived visual appeal through website design (e.g., text, style, graphics, colors, logos, themes and slogans)	[6, 15, 30, 32, 35]

Table 3.

Summary of marketing stimulus

Research Design: Experiment		
Factor	Manipulation	Study
Bonus	Offering bonus packs	[56]
Discount	Offering price discounts	[56]
Product type	Changing the product type (Hedonic product vs Utilitarian product)	[56]
Product price	Changing the product price (Expensive vs Inexpensive)	[56]
Scarcity	Limiting the promotion frequency, the offer period, or the quantity	[60]
Research Design: Survey		
Factor	Definition	Study
Price attribute	The price of a product	[36]
Product availability	The presence of a diversity of various products in the online store	[30]
Sensory attribute	The aesthetic elements (e.g., color, design, style) of a product that are shown in the web store	[36]
Research Design: Interview		
Factor	Definition	Study
Idea	New styles/fashions, featured items, top picks/favorites	[9]
Promotion	Additional item with purchase (e.g., "buy 1, get 1 free"), coupon, percent off, free gift with purchase	[9]
Sales	On sale (clearance, sales, and markdowns), bold sale price on product	[9]
Suggestion	Suggested non-coordination items, customer recommendations, the last thing the consumer looked at	[9]

Table 4.

Summary of situational stimulus

Research design: Survey		
Factor	Definition	Study
Variety of selection	The perception about the diversity of products in the online store	[36]

Table 5.

Summary of impulsive consumer characteristic

Survey		
Factor	Definition	Study
Hedonic consumption needs	The potential needs of consumers to satisfy individual requirements for subjective fun and pleasure during shopping	[8, 26]
Hedonic shopping motivation	The hedonic shopping motivation includes: Adventure/explore shopping, Value shopping, Idea shopping, Social shopping, and Relaxation shopping	[34]
Impulsive buying tendency	A consumer's internal trait of responding quickly to a given stimulus without deliberating regarding action outcomes	[8, 10, 30, 53]
Informational social influence	An individual's tendency to obtain information by observing or directly seeking information from other people	[16]
Instant gratification	The degree of immediate gratification that an individual obtains via making an impulse purchase	[30]
Normative social influence	An individual's need to use a website in order to identify with, or enhance, his or her image in the eyes of significant others, and a willingness to conform to the expectations of others in making purchase decisions	[16]

Table 6.
Summary of cognitive reaction

Factor	Definition	Study
Attentional involvement	The perceived attention to media information without interference from outside or from other factors unrelated to the media	[55]
Cognitive product involvement	A psychological reaction that is induced by functional, utilitarian aspects of products. It drives consumers to seek relevant types of information when forming product attitudes and intentions	[12]
Cognitive state	How one understands, thinks and interprets information	[10]
Concentration	The consumers' responses in putting their attention to the web store	[28]
Merchandise attractiveness	The perception of the size and attractiveness of the assortment	[51]
Normative evaluations	The consumer judgments regarding the positive appropriateness of impulse buying behavior	[8, 10, 30, 58, 59]
Perceived control	The perception of being in control over what to see and do in the web store	[28]
Perceived ease of use	The degree to which a person believes that using a particular system would be free from effort	[51]
Product search effectiveness	The ability of the recommendation agent to fulfill consumers' needs for information and exploration	[20]
Perceived usefulness	The extent to which the online user believes that his or her shopping productivity will be enhanced by using a particular website	[35, 58]
Satisfaction	The perception of the pleasure fulfillment of a service	[6, 20]
Website communication style	The subjective perception of the style in which the site communicates with and services its visitors	[51]

Table 7.
Summary of affective reaction

Factor	Definition	Study
Affective product involvement	A psychological reaction derived from value-expressive or affective motives	[12]
Affective state	A person's emotional state, mood, and self-feelings	[10]
Arousal	A state of feeling that varies from feelings of excitement, stimulation, alertness or activeness, to feelings of being tired, sleepy or bored	[1, 25, 44]
Desirability	The extent to which a deal is perceived as being attractive to an individual	[17]
Dominance	The extent to which an individual feels in control of, or free to act, in a particular situation	[1]
Enjoyment	The pleasure a customer obtained during a shopping experience	[7, 15, 28, 55]
Flow experience	A state of optimal psychological experience when an individual becomes entirely focused on his or her activity and feels many positive experiential characteristics, including great enjoyment and loss of self-consciousness	[21]
Negative affects	The extent to which a person feels distress, irritation, and disturbance	[51]
Pleasure	The degree to which a person feels good, joyful, happy or satisfied with a particular situation	[1, 25, 44]
Positive affects	The extent to which a person feels enthusiastic, excited, and inspired	[8, 51]

Table 8.

Summary of response

Felt urge to buy impulsively		
Factor	Definition	Study
Affective impulse buying tendency	The degree to which an individual is likely to make unintended, immediate, and unreflective purchases	[34]
Purchase intention	An intention to make an online purchase	[58, 59]
Urge to buy impulsively	A sudden, often powerful and persistent urge to buy something immediately	[1, 6-8, 25, 30, 35, 44, 45, 51, 53, 55, 56, 58, 59]
Online impulse buying		
Category	Definition	Study
Affective impulse behavior	Unplanned purchases that are associated with feelings of excitement and overpowering urges to buy	[16]
Cognitive impulse behavior	Unplanned purchases that are related to a lack of planning in association with the purchase decisions	[16]
Impulse buying	A sudden and immediate online purchase with no pre-shopping intentions. It is unplanned, spontaneous, and decided on the spot	[4, 13, 15, 17, 21, 26, 32, 36, 45, 51, 58, 59]
Impulse enactment	The promotional item bought, or the amount of money spent, by clicking through the promotion	[25, 43, 44]
Impulse buying expenditure	The actual amount of money spent on impulse buying	[15]
Online impulse purchase decision	The alternative purchase decision made	[10]
Unplanned purchase	Any purchases made in addition to what consumers had initially said they would buy	[20, 22, 28, 60]

Table 9.

The direct effect of stimulus on response (S-R)

Website stimulus			
Hypothesis	Theory/Model	Relationship	Study
Visual appeal → Urge to buy impulsively* Navigability → Urge to buy impulsively* Security → Urge to buy impulsively*	Latent state-trait theory	1.1 → 3.1	[53]
Usability → Impulse buying^ Feedback → Impulse buying (-)^ Rehearsal → Impulse buying (-)^	NIL	1.1 → 3.2	[13]
Interactivity and personalization → Online buying impulse* Design → Online buying impulse^ Ease of use → Online buying impulse (-)* Quality and quantity of information → Online buying impulse^ Reliability and respect for commitments → Online buying impulse^ Security and privacy → Online buying impulse^	NIL	1.1 → 3.1	[6]
Marketing stimulus			
Hypothesis	Theory/Model	Relationship	Study
Continuing time scarcity → Unplanned buying*	Theory of resource allocation	1.2 → 3.2	[60]
Quantity scarcity → Unplanned buying*	Reactance theory	1.2 → 3.2	[60]
Frequency scarcity → Unplanned buying*	NIL	1.2 → 3.2	[60]
Sensory attributes → e-Impulse buying*	NIL	1.2 → 3.2	[36]
Situational stimulus			
Hypothesis	Theory/Model	Relationship	Study

Variety of selection → e-Impulse buying (-)*		1.3 → 3.2	[36]
Impulsive consumer characteristic			
Hypothesis	Theory/Model	Relationship	Study
Impulsive buying tendency → Consumption impulse*	CIFE model	1.4 → 3.1	[10]
Impulsiveness → Urge to buy impulsively*	Latent state-trait theory	1.4 → 3.1	[53]
Hedonic shopping motivation → Impulse buying*	NIL	1.4 → 3.2	[26]
Adventure/explore shopping → Affective impulse buying tendency* Idea shopping → Affective impulse buying tendency* Social shopping → Affective impulse buying tendency* Relaxation shopping → Affective impulse buying tendency* Value shopping → Affective impulse buying tendency^	NIL	1.4 → 3.1	[34]
Impulsive buying tendency → Buying impulsiveness* Hedonic consumption needs → Buying impulsiveness*	NIL	1.4 → 3.1	[8]
Normative social influence → Affective impulse behavior* Informational social influence → Cognitive impulse behavior (-)^	NIL	1.4 → 3.2	[16]
Notes: *Significant effect ^Insignificant effect (-) Hypothesized as negatively related			

Table 10.
The effect of website stimulus on organism and response (S-O-R)

Cognitive reaction			
Hypothesis	Theory/Model	Relationship	Study
Task-relevant cue → Perceived usefulness* → Perceived enjoyment* → Urge to buy impulsively* Mood-relevant cue → Perceived usefulness* → Perceived enjoyment* → Urge to buy impulsively*	S-O-R framework	1.1 → 2.1 → 2.2 → 3.1	[35]
Visual appearance → Quality of e-service → Commitment → Impulse buying* Navigation → Quality of e-service → Commitment → Impulse buying* Customized view → Quality of e-service → Commitment → Impulse buying*	S-O-R framework	1.1 → 2.1 → 3.2	[32]
Use of recommendation agent → Product promotion effectiveness* → Customer satisfaction* → Unplanned purchase* Use of recommendation agent → Product search effectiveness* → Unplanned purchase*	NIL	1.1 → 2.1 → 3.2	[20]
Ease of use → Satisfaction* → Buying impulse* Quality and quantity of information → Satisfaction* → Buying impulse* Design → Satisfaction* → Buying impulse* Interactivity and personalization → Satisfaction* → Buying impulse* Security and privacy → Satisfaction* → Buying impulse*	NIL	1.1 → 2.1 → 3.1	[6]
Affective reaction			
Hypothesis	Theory/Model	Relationship	Study
Task-relevant cue → Perceived enjoyment* → Urge to buy impulsively* Mood-relevant cue → Perceived enjoyment* → Urge to buy impulsively*	S-O-R framework	1.1 → 2.2 → 3.1	[35]

Visual appearance → Quality of e-service* → Pleasure* → Impulse buying*	S-O-R framework	1.1 → 2.2 → 3.2	[32]
Navigation → Quality of e-service* → Pleasure* → Impulse buying*			
Customized view → Quality of e-service* → Pleasure* → Impulse buying*			
e-Store design quality → Shopping enjoyment* → Impulse buying behavior*	S-O-R framework	1.1 → 2.2 → 3.2	[15]
e-Store navigation quality → Shopping enjoyment* → Impulse buying behavior*			
e-Store content quality → Shopping enjoyment^ → Impulse buying behavior*			
Text → Pleasure^/Arousal^/Dominance*	S-O-R framework	1.1 → 2.2 → 3.1	[1]
Still image → Pleasure^/Arousal^/Dominance*			
Video → Pleasure^/Arousal^/Dominance*			
Pleasure → Buying intent^			
Arousal → Buying intent*			
Dominance → Buying intent^			
Telepresence → Pleasure* → Buying impulse*	S-O-R framework	1.1 → 2.2 → 3.1	[25, 44]
Social presence → Pleasure* → Buying impulse*			
Value-added search mechanism → Shopping enjoyment* → Unplanned purchase*	Technology acceptance model	1.1 → 2.2 → 3.2	[28]
Challenge → Shopping enjoyment* → Unplanned purchase*			
Scarcity claim → Desirability → Impulse purchase#	Heuristics information processing	1.1 → 2.2 → 3.2	[17]
Popularity claim → Desirability → Impulse purchase#			

Note: *Significant effect ^Insignificant effect #Research in progress

Table 11.

The interplay between cognitive and affective reaction

Hypothesis	Theory/Model	Relationship	Study
Attentional involvement → Enjoyment*	Flow theory	2.1 → 2.2	[55]
Normative evaluations → Positive affect*	Theory of reasoned action	2.1 → 2.2	[8]
Website communication style → Positive affect*	Cognitive emotion theory	2.1 → 2.2	[51]
Website communication style → Negative affect (-)^			
Ease of use → Positive affect^			
Ease of use → Negative affect (-)^			
Merchandise attractiveness → Positive affect*			
Merchandise attractiveness → Negative affect (-)*			
Product promotion effectiveness → Customer satisfaction*	NIL	2.1 → 2.2	[20]
Perceived usefulness → Perceived enjoyment*	NIL	2.1 → 2.2	[35]

Note: *Significant effect ^Insignificant effect (-) Hypothesized as negatively related

Table 12.
The chain effect of online impulse buying response

Hypothesis	Theory/Model	Relationship	Study
Urge to buy impulsively → Impulse buying*	NIL	3.1 → 3.2	[25, 44, 51]

Note: *Significant effect

Table 13.
The moderating role of impulsive consumer characteristic

(Moderator) Hypothesis	Theory/Model	Relationship	Study
(Value perception) Buying impulse → Impulse enactment*	Reflective-impulsive model	(1.4) 3.1 → 3.2	[25, 44]
(Impulsiveness) Perceived website quality → Urge to buy impulsively*	Latent state-trait theory	(1.4) 1.1 → 3.1	[53]
(Impulsivity) Enjoyment → Impulse buying intention*	NIL	(1.4) 2.2 → 3.1	[55]
(Trust propensity) Flow experience → Impulsive buying*	NIL	(1.4) 2.2 → 3.2	[21]
(Willingness to buy) Flow experience → Impulsive buying*			
(Impulse buying superiority) Ease of use → Buying impulse^	NIL	(1.4) 1.1 → 2.1	[6]
(Impulse buying superiority) Quality and quantity of information → Buying impulse^			
(Impulse buying superiority) Design → Buying impulse^			
(Impulse buying superiority) Interactivity and personalization → Buying impulse*			
(Impulse buying superiority) Reliability and respect for commitments → Buying impulse^			
(Impulse buying superiority) Security and privacy → Buying impulse^			
(Impulse buying superiority) Satisfaction → Buying impulse*			
(Trust in one's impulses) Ease of use → Buying impulse^			
(Trust in one's impulses) Quality and quantity of information → Buying impulse^			
(Trust in one's impulses) Design → Buying impulse^			
(Trust in one's impulses) Interactivity and personalization → Buying impulse*			
(Trust in one's impulses) Reliability and respect for commitments → Buying impulse^			
(Trust in one's impulses) Security and privacy → Buying impulse^			
(Trust in one's impulses) Satisfaction → Buying impulse*			

Note: *Significant effect ^Insignificant effect

Appendix A.

Summary of identified study

Study	Research focus	Theoretical foundation	Research methodology	Research context	Sample	Factor
Adelaar et al. [1]	To explore the effects of media formats on the emotions and the impulse buying intentions for music compact discs (CDs)	S-O-R framework	Experiment	Music CDs	U.S. students (n=95)	• Media format (Text, still images, video) • Visual/ verbal preference • Emotional response (Pleasure, arousal, dominance) • Impulse buying tendency • Impulse buying intent
Bati and Atici [4]	To explore how consumer demographic characteristics predict online impulse purchase behaviors in technology products	NIL	Survey	Technology products	Turkish consumers (n=240)	• Consumer demographics toward online impulse buying (e.g., gender, age, income)
Bressolles et al. [6]	To investigate the effects of electronic service quality on customer satisfaction and buying impulse	NIL	Survey	Electronic and cultural goods	French consumers (n=4109)	• Electronic service quality (ease of use, quality and quantity of information, design, reliability and respect for commitments, security and privacy, interactive personalization) • Satisfaction • Functional buying impulsivity (impulse buying superiority, trust in one's impulses) • Buying impulse
Brooks et al. [7]	To investigate web features that mitigate online impulse purchasing	Distraction-conflict theory	Experiment	University-branded clothing and accessories	U.S. students (n=237)	• Perceived enjoyment • Urge to buy impulsively • Distraction • Interruption
Chih et al. [8]	To examine individuals' internal factors of online buying impulsiveness	NIL	Survey	Travel plans	Taiwan consumers (n=364)	• Hedonic consumption needs • Impulsive buying tendency • Positive affective • Normative evaluations • Buying impulsiveness
Dawson and Kim [10]	To investigate the effects of external and internal trigger cues of online impulse buying	Consumption impulse formation enactment (CIFE) model	Experiment	Appeal items	U.S. female students (n=300)	• External trigger cues of impulse buying (sales, promotions, ideas, suggestions) • Internal cues of impulse buying (cognitive and affective states) • Impulse buying tendency • Normative evaluation • Consumption impulse • Online impulse purchase decision

Dawson and Kim [9]	To investigate external cues on apparel web sites that encourage impulse buying.	Consumption impulse formation enactment (CIFE) model	Focus group interview Content analysis	Appeal items	U.S. female students (n=15)	• Marketing stimuli (sales, promotions, ideas, suggestions)
Drossos et al. [12]	To study the dimensionality of the product involvement construct and its effects on consumers' impulse purchase intentions	Elaboration likelihood model	Experiment	Antiperspirants, cold remedies, chocolate bars, soft drinks	University student (n=636)	• Affective product involvement • Cognitive product involvement • Impulse buying tendency
Dutta et al. [13]	To examine the effects of website characteristics (usability, feedback, and rehearsal) on consumer impulse purchase decisions	Psychology of mental budgeting	Experiment	CDs, DVDs, and books	U.S. students (n=172)	• Feature of online payment process (usability, feedback, rehearsal) • Recall of past experience • Posting expenses to mental accounting • Impulse buying
Floh and Madlberger [15]	To test the effects of virtual atmospheric cues on online impulse-buying behavior and spending	S-O-R framework	Survey	Books	Did not specify (n=508)	• Atmospheric cues (e-store content, e-store design, e-store navigation) • Shopping enjoyment • Impulsiveness • Browsing • Impulse buying • Impulse buying expenditure
Gwee and Chang [16]	To investigate the social influences in affecting impulse purchase behaviors	NIL	Survey	Group buying website	Asian university students (n=98)	• Informational social influence • Normative social influence • Cognitive impulse behavior • Affective impulse behavior • Product type (Hedonic vs. Utilitarian) • e-Loyalty
Gwee and Chang [17]	To study the use of persuasive claims by marketers in affecting impulse purchase	Heuristics information processing	Experiment	Stationary	Asian university student (Research-in-progress)	• Scarcity claim • Popularity claim • Need for uniqueness • Desirability • Impulse purchase
Hostler et al. [20]	To illustrate the impact of recommendation agents on unplanned online consumer purchase behavior	NIL	Experiment	Movies	U.S. university students (n=251)	• Use of recommendation agent • Product promotion effectiveness • Product search effectiveness • Customer satisfaction with website • Unplanned purchase
Hsu et al. [21]	To investigate the relationship between flow experience and impulsive buying	Flow theory	Survey	Did not specify	Yahoo shopping center consumers (n=395)	• Flow experience • Trust propensity • Willingness to buy • Self-confidence

Jeffrey and Hodge [22]	To examine the factors that lead to an increased willingness to purchase impulse items	Prospect theory	Survey	High school reunion web store	HHS reunion website consumers (n=311)	• Impulsive buying • Mental accounting • Provision of a specific reason to purchase • Impulse purchase
Khalifa and Shen [25]	To study the relationship between system design characteristics and online impulse buying.	S-O-R framework	Experiment	Movies	Hong Kong university students (n=151)	• System effect (interactivity, vividness) • Presence (telepresence, social presence) • Emotional responses (pleasure, arousal) • Buying impulse • Value perception • Impulse enactment
Kim and Eastin [26]	To test the effect of hedonic shopping motivation on online consumer shopping behavior	Technology acceptance model	Survey	Did not specify	U.S. university students (n=255)	• Hedonic shopping motivation • Exploratory information seeking • Impulse buying
Koufaris [28]	To investigate the impacts of emotional responses and cognitive responses on consumer behaviors	Flow theory; Technology acceptance model	Survey	Books	U.S. consumers (n=280)	• Product involvement • Perceived skills • Value-added search mechanisms • Challenges • Perceived control • Shopping enjoyment • Concentration • Unplanned purchase
Liu et al. [30]	To study how the website cues affect personality traits to urge the impulse purchase online	S-O-R framework	Survey	Group shopping website	Chinese university students (n=318)	• Product availability • Visual appeal • Website ease of use • Impulsiveness • Normative evaluation • Instant gratification • Urge to buy impulsively
Moez [32]	To examine characteristics of a commercial website and the role they played in the development of the pleasure of service and commitment to impulse buying	NIL	Survey	Technology product (iPod)	Students (n=302)	• Visual appearance • Navigation • Customized view • e-Service quality • Pleasure of service • Commitment • Impulse buying
Ozen and Engizek [34]	To explore the impacts of hedonic motivations on their online impulse buying	NIL	Survey	Did not specify	Turkish consumers (n=430)	• Hedonic shopping motivations (Adventure/ idea, value, social and relaxation shopping) • Affective impulse buying tendency

	tendencies					
Parboteeah et al. [35]	To investigate the impacts of website characteristics on consumers' urges to buy impulsively	S-O-R framework	Experiment	Tote bags and accessories	U.S. university students (n=264)	• Task-relevant cues • Mood-relevant cues • Perceived usefulness • Perceived enjoyment • Urge to buy impulsively
Park et al. [36]	To explore the relationship among product attributes, web browsing, and impulse buying for apparel products in the Internet context	NIL	Survey	Appeal products	Korean university students (n=356)	• Variety of selection • Price attributes • Sensory attributes • Utilitarian web browsing • Hedonic web browsing • e-Impulse buying
Schneider [43]	To study how temporal proximity could trigger impulsive online buying behavior	NIL	Experiment	Online music store	University students (Research-in-progress)	• Future consequence • Perceived temporal proximity • Online buying
Shen and Khalifa [44]	To investigate the system effect on impulse buying	S-O-R framework; Reflective-impulsive model	Experiment	Movies	Hong Kong university students (n=151)	• System effect (interactivity, vividness, telepresence, social presence) • Pleasure • Arousal • Buying impulse • Value perception • Impulse buying
Shukla and Mishra [45]	To study the effects of consumers' cognitive beliefs on e-impulsive buying	NIL	Survey	Did not specify	Indian consumers (n=207)	• Attitude towards online shopping • Attitude towards Facebook advertising • Brand consciousness • Urge to buy impulsively • e-Impulsive buying
Sun and Wu [48]	To investigate trait predictors of online impulsive buying	Mowen's 3M model	Survey	Did not specify	US university students (n=381)	• Materialism • Need for arousal • Task orientation
Verhagen and van Dolen [51]	To study the influence of online store beliefs on consumer online impulse buying	Cognitive emotion theory	Survey	Fashion items (clothing, accessories, jewelry)	Dutch consumers (n=532)	• Merchandise attractiveness • Ease of use • Enjoyment • Website communication style • Positive affect • Negative affect • Browsing • Urge to buy impulsively

Wells et al. [53]	To examine the interplay between a consumer's inherent impulsiveness to buy and website quality on impulse buying	Latent state-trait theory	Experiment	University-branded accessories	U.S. university students (n=223)	• Impulse buy • Impulsiveness • Perceived website quality (navigability, security, visual appeal) • Urge to buy impulsively
Wu and Ye [55]	To investigate the influence of the impulsive personality of consumers on buying behavior during mobile service transactions	Flow theory	Survey	iTunes products	iTunes consumers (n=322)	• Convergence in mobile media technology • Attentional involvement • Enjoyment • Impulsivity • Impulse buying intention
Xu and Huang [56]	To study the forms of sales promotion on online impulse buying	NIL	Experiment	Grocery store items	Chinese university students (n=280)	• Sales promotion forms (price discount vs. bonus pack) • Product base price (expensive vs. inexpensive) • Product type (hedonic vs. utilitarian)
Zhang et al. [58]	To investigate effects of consumers' cognitive beliefs on online impulse buying	Technology acceptance model	Survey	Did not specify	U.S. university students (n=294)	• Perceived ease of use • Perceived usefulness • Web use • Subjective norms • Intention • Impulsiveness • Purchase
Zhang et al. [59]	To identify factors that influence impulse purchasing during online transactions	Technology acceptance model	Survey	Did not specify	U.S. university students (n=332)	• Subjective norms • Purchase intention • Consumer impulsivity • Gender • Actual purchase
Zheng et al. [60]	To examine how different types of marketing promotion tactics influence unplanned buying behavior	Theory of resource allocation; Reactance theory	Experiment	Did not specify	Chinese consumers (n=212)	• Continuing time scarcity • Quantity scarcity • Frequency scarcity • Planned buying • Unplanned buying